

This Page Is Inserted by IFW Operations  
and is not a part of the Official Record

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning documents *will not* correct images,  
please do not report the images to the  
Image Problem Mailbox.**



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/020,207	12/18/2001	Reza-Ur Rahman Khan	1875.1640000	7969

7590

07/14/2003

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.  
1100 New York Avenue, N.W.  
Suite 600  
Washington, DC 20005-3934

EXAMINER

SOWARD, IDA M

ART UNIT

PAPER NUMBER

2822

DATE MAILED: 07/14/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/020,207

Applicant(s)

KHAN ET AL.

Examiner

Ida M Soward

Art Unit

2822

- The MAILING DATE of this communication appears on the cover sheet with the correspondence address -

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 April 2003.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-54 is/are pending in the application.
- 4a) Of the above claim(s) 28-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-27 and 31-54 is/are rejected.
- 7) ☒ Claim(s) 18 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                  | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____                                    |

Art Unit: 2822

## DETAILED ACTION

This Office Action is in response to the Applicants' amendment filed April 16, 2003.

### *Specification*

The objection to the title of the invention has been withdrawn due to the amendment filed.

### *Claim Objections*

Claim 18 is objected to because of the following informalities: to should have been between "relative" and "a" in last line of the claim. Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-8, 13, 16-17, 31-32 and 45-48 are rejected under 35 U.S.C. 102(b) as being anticipated by Karnezos (6,020,637).

Art Unit: 2822

Karnezos teaches a substrate in an integrated circuit (IC) package **100**, comprising: opposing first and second surfaces, wherein one of the first and the second surfaces has a plurality of solder ball contact pads **118b** formed thereon, wherein the first surface has a central opening **154**, whereby the at least one protruding edge portion provides a shorter distance between a trace on the first surface and an IC die relative to a distance between the trace and the IC die when the at least one protruding edge portion is not present, wherein the central opening has an edge **166b**, wherein the edge includes at least one protruding edge portion that extends into the central opening and at least one recessed edge portion, wherein the first surface includes at least one hole proximate to the edge; a substantially rectangular central opening; the IC package being a ball grid array package; the at least one protruding edge portion being tab-shaped; a trace **164** on the first surface corresponding to the at least one protruding edge portion, wherein the trace extends into the at least one protruding edge portion; a central bondable ground ring **118a**; and the at least one protruding edge portion configured to allow a wire to couple an IC die **112** to the trace.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 9-12, 14-15, 18-27, 33-36, 39, 42 and 49-54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Karnezos (6,020,637) as applied to claims 1-8, 13, 16-17, 31-32 and 45-48 above, and further in view of Yazawa et al. (US 2002/0072214 A1).

Karnezos teaches all mentioned in the rejection above. Karnezos further teaches a first trace **118** on the first surface of the substrate proximate to a first portion of the edge and a central ring **118a**; a second trace **118b** on the first surface of the substrate proximate to a second portion of the edge, whereby the first portion of the edge allows for a shorter distance between the first trace and an IC die **112** relative to a distance between the second trace and the IC die; the second portion of the edge configured to allow a wire **126** to couple an IC die **112** to the second portion of the central bondable ring, wherein the central opening has an edge, wherein the edge includes: (a) a protruding edge portion that extends across at least a portion of the central bondable ring, (b) a recessed edge portion that exposes a portion of the central bondable ring, (c) a hole proximate to the edge, wherein the hole exposes a portion of the central bondable ring; and the central bondable ring **164** surrounds a cavity (Figure 4, col. 8, lines 1-37). However, Karnezos fails to teach a stiffener. Yazawa et al. teach an integrated circuit (IC) package having a substrate **30** capable of being coupled to a surface of a stiffener **54**, wherein the substrate is coupled to the surface of the stiffener (Figure 6, page 4, paragraphs [0065] – [0069]). Yazawa et al. further teach the stiffener having a first surface, wherein the first surface of the stiffener is attached to the second surface of the substrate; the substrate has a central opening that is open at the first and

Art Unit: 2822

second surfaces of the substrate, wherein the central opening accommodates the IC die 10; the central opening has an edge, wherein the edge has a protruding edge portion that extends across a portion of a central bondable ring; a trace 34 of the first surface of the substrate extends into the protruding edge portion and the stiffener having a central cavity that coincides with the central opening of the substrate. Since Karnezos and Yazawa et al. are from the same field of endeavor (IC package devices), the purpose disclosed by Yazawa et al. would have been recognized in the pertinent art of Karnezos. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the integrated circuit (IC) package of Karnezos by incorporating the integrated circuit (IC) package having a stiffener of Yazawa et al. to provide a stiffener with strength sufficient to preserve the flat surface shape (paragraph [0067]).

Claims 37-38, 40-41 and 43-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Karnezos (6,020,637) and Yazawa et al. (US 2002/0072214 A1) as applied to claims 1-36, 39, 42 and 45-54 above, and further in view of Chang (5,366,589).

Karnezos and Yazawa et al. teach all mentioned in the rejection above. However, Karnezos and Yazawa et al. fail to teach a bond wire that couples a pin. Chang teaches a bond wire that couples a pin (col. 1, lines 9-23). Since Karnezos, Yazawa et al. and Wang are from the same field of endeavor (semiconductor structures), the purpose disclosed by Wang would have been recognized in the

Art Unit: 2822

pertinent art of Karnezos and Yazawa et al. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the integrated circuit (IC) package of Karnezos and the integrated circuit (IC) package having a stiffener of Yazawa et al. by incorporating the bond wire and pin of Chang to interconnect circuitry (col. 1, lines 9-23).

### ***Response to Arguments***

Applicant's arguments filed 04-16-03 have been fully considered but they are not persuasive.

In response to the remarks on page 14, Karnezos teaches at least one protruding edge portion 166a that extends into the central opening which is a recessed edge portion; and a first surface of the substrate including at least one hole (between edges 154) proximate to the edge of the central opening.

In response to the remarks concerning claim 18, Karnezos teaches one of opposing first and second surfaces of the substrate having a plurality of solder ball contact pads (above 120) formed thereon; the first surface of the substrate has a central opening, and the central opening has an edge; a first portion of the edge configured to cover a first portion of a central bondable ring when a substrate is coupled to the surface of 160; and a second portion of the edge (near 154) configured to expose a second portion of the central bondable ring when the substrate couples to the surface of 160.



***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following patent are cited to further show the state of the art with respects to packaged semiconductor structures having stiffeners:

Ameen et al. (5,907,903)

Beaman et al. (5,433,631)

Loo (5,394,009)

Parker et al. (5,208,504).

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Art Unit: 2822

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ida M Soward whose telephone number is 703-305-3308. The examiner can normally be reached on Monday - Thursday, 6:30 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 703-308-4905. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

ims  
June 25, 2003



AMIR ZARABIAN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800